(1) 18.7 inches for the design landing weight conditions; and

(2) 6.7 inches for the design takeoff weight conditions.

(b) If airplane lift is simulated by air cylinders or by other mechanical means, the weight used for the drop must be equal to *W*. If the effect of airplane lift is represented in free drop tests by an equivalent reduced mass, the landing gear must be dropped with an effective mass equal to

$$W_e = W \times \frac{h + (1-L)d}{h+d}$$

where—

W_e = the effective weight to be used in the drop test (lbs.);

h = specified free drop height (inches);

d = deflection under impact of the tire (at the approved inflation pressure) plus the vertical component of the axle travel relative to the drop mass (inches);

$W = W_M$ for main gear units (lbs.), equal to the static weight on that unit with the airplane in the level attitude (with the nose wheel clear in the case of nose wheel type airplanes);

$W = W_T$ for tail gear units (lbs.), equal to the static weight on the tail unit with the airplane in the tail-down attitude;

$W = W_N$ for nose wheel units (lbs.), equal to the vertical component of the static reaction that would exist at the nose wheel, assuming that the mass of the airplane acts at the center of gravity and exerts a force of 1.0 *g* downward and 0.25 *g* forward; and

L = ratio of the assumed airplane lift to the airplane weight, but not more than 1.0.

(c) The drop test attitude of the landing gear unit and the application of appropriate drag loads during the test must simulate the airplane landing conditions in a manner consistent with the development of a rational or conservative limit load factor value.

(d) The value of *d* used in the computation of W_e in paragraph (b) of this section may not exceed the value actually obtained in the drop test.

(e) The limit inertia load factor *n* must be determined from the free drop test in paragraph (b) of this section according to the following formula:

$$n = n_j \times \frac{W_e}{W} + L$$

where—

n_j = the load factor developed in the drop test (that is, the acceleration *dv/dt* in *g*'s recorded in the drop test) plus 1.0; and

W_e, *W*, and *L* are the same as in the drop test computation.

(f) The value of *n* determined in paragraph (e) of this section may not be more than the limit inertia load factor used in the landing conditions in § 25.473.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–23, 35 FR 5675, Apr. 8, 1970]

§ 25.727 Reserve energy absorption drop tests.

(a) If compliance with the reserve energy absorption condition specified in § 25.723(b) is shown by free drop tests, the drop height may not be less than 27 inches.

(b) If airplane lift is simulated by air cylinders or by other mechanical means, the weight used for the drop must be equal to *W*. If the effect of airplane lift is represented in free drop tests by an equivalent reduced mass, the landing gear must be dropped with an effective mass,

$$W_e = \frac{Wh}{h+d}$$

where the symbols and other details are the same as in § 25.725(b).

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–23, 35 FR 5675, Apr. 8, 1970]

§ 25.729 Retracting mechanism.

(a) *General.* For airplanes with retractable landing gear, the following apply:

(1) The landing gear retracting mechanism, wheel well doors, and supporting structure, must be designed for—

(i) The loads occurring in the flight conditions when the gear is in the retracted position,

(ii) The combination of friction loads, inertia loads, brake torque loads, air loads, and gyroscopic loads resulting from the wheels rotating at a peripheral speed equal to 1.3 V_s (with the flaps in takeoff position at design takeoff weight), occurring during retraction and extension at any airspeed up to 1.6